



Assessment of Glass Bonding Adhesives with Humidified Topcoat

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard describes a procedure to evaluate adhesive bonding capability on original equipment manufacturer (OEM) topcoat systems. Multiple glass adhesives can be evaluated on a given topcoat. Topcoats are exposed to humidity prior to adhesive application in an attempt to aggravate bonding.

1.2 Applicability. This procedure applies to automotive glass bonded to painted vehicle openings. It is used to determine an adhesives bonding capability for assembly plant use.

1.3 Remarks. This test procedure is used as one (1) of the ways to determine robustness of a glass bonding adhesive. It can differentiate adhesive performance on specific topcoat systems. It is only a portion of glass adhesive development requirement per GMW3041.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3041

GMW3368

GMW14729

GMW16569

3 Resources

3.1 Facilities. GM vehicle assembly and laboratory facilities as applicable.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Clean low lint paint shop quality rags.

3.2.2 Quantity of 100 mm × 300 mm cold rolled steel (CRS) panels with specified topcoat paint layering.

3.2.3 Panel holding racks, 70 degrees to 80 degrees from horizontal.

3.2.4 Air operated or electric chalk gun capable of dispensing glass bonding adhesives.

3.2.5 Nozzles for adhesive cartridges capable of producing beads as described in GMW3368.

3.2.6 Panel holding device for securing test panel to bench or table. For example: C-clamp.

3.2.7 Skill knife.

3.2.8 Pliers or similar tool for holding bead during quick knife adhesion (QKA).

3.3 Test Vehicle/Test Piece. Unless otherwise specified, all test materials are to be defined by the requestor.

3.3.1 Glass bonding adhesive system(s).

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3.3.2 Topcoat System. All topcoat systems are to include definition of paint layering, E-coat, primer surfacer and basecoat/clearcoat layering and bake schedules.

3.3.3 Painted Panels. Painted test panels may be assembly plant or laboratory prepared.

3.3.3.1 Plant paint line panels. One (1) per color per exposure condition to be supplied by the assembly plant paint department.

3.3.3.2 Laboratory prepared panels, one (1) per color per exposure per under bake and over bake condition.

3.3.3.2.1 Underbake. Unless otherwise specified, 15 minutes at target (T) bake -6 °C (-10 °F).

3.3.3.2.2 Overbake. Unless otherwise specified, 90 minutes at target (T) bake +14 °C (25 °F).

Note: Unless otherwise specified, all basecoat film build targets are to be + 50% of nominal. Clearcoat filmbuilds are to be 25 µm ± 5 µm (1 mils ± 0.2 mils). Refer to GMW16569.

3.3.3.3 The number of painted panels are defined by color, bake condition (underbake, overbake, or plant processed) and the two (2) exposure conditions per the following examples.

- **Example 1:** Two (2) colors that are plant paint shop prepared, one (1) bake with two (2) exposures yields four (4) test panels or, (2 colors × 1 bake × 2 exposures = 4 test panels).
- **Example 2:** Three (3) colors laboratory prepared, under bake and over bake, with two (2) exposure yields 12 test panels or, (3 colors × 2 bakes × 2 exposures = 12 test panels).

3.4 Test Time. Not applicable.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Trained personnel experienced in testing glass bonded adhesive systems.

4 Procedure

4.1 Preparation. After exposure, wipe the top half of the humidity exposed panels with a dry, low lint, paint shop quality rag. One (1) wipe from panel top down only with one (1) rag per panel as not to transfer wipe excess. Minimize the time to wipe of post humidity panels.

4.2 Conditions.

4.2.1 Environmental Conditions. Painted Panel Exposure Conditions. In panel holding racks, expose the painted test panels per the following environments:

- Ninety (90) minutes at room temperature, 22 °C ± 3 °C and 50% ± 5% relative humidity (RH).
- Ninety (90) minutes humidity at 38 °C ± 3 °C and 95% RH ± 5% RH per GMW14729 Option A.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions. Apply one (1), approximately 250 mm, bead per adhesive to each test panel per GMW3368. Up to four (4) beads (adhesives) may be applied per panel. When more than one (1) adhesive is used, maintain and note the adhesive location for future evaluation and reporting purposes. Cure for 168 h at 22 °C ± 3 °C and 50% ± 5% RH. Perform QKA per GMW3368, after 168 h cure.

5 Data

5.1 Calculations. Calculate and report the percent adhesion per GMW3368.

5.2 Interpretation of Results. See GMW3368.

5.3 Test Documentation. Record all materials used during testing including the information from 5.3.1 through 5.3.4.

5.3.1 Test material source identification.

5.3.2 Test material product identification.

5.3.3 Test material batch numbers.

5.3.4 Substrate identification.

5.3.5 Criteria for acceptable results are determined by the applicable material specification.

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